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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/645,882	08/20/2003	John T. Welch	DEI 005 UTL	8192

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EXAMINER

LEUNG, RICHARD L

ART UNIT	PAPER NUMBER
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3744

DATE MAILED: 10/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/645,882

Applicant(s)

WELCH, JOHN T.

Examiner

Richard L. Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-66 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 27-53 and 58-66 is/are allowed.
- 6) ☒ Claim(s) 1-4, 7-11, 14-18, 54, 56 and 57 is/are rejected.
- 7) ☒ Claim(s) 5, 6, 12, 13, 19-26 and 55 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 10, 11, 18, 54, and 56 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5515682 (Nagakubo et al.).

Regarding claims 1, 10, 11, and 18, Nagakubo et al. disclose a temperature control system for an electronic component (laser diode) 2, the system comprising a Peltier module (Peltier device) 1 comprising a cooling side (cooling plane) 5 that absorbs heat when electric current flows through the Peltier module 1 in a first direction, a Peltier driver (driver section) 13 comprising a control input capable of receiving control signals, the Peltier driver 13 being capable of providing to the Peltier module a current regulated by the control signals, a temperature sensor 11 comprising a thermistor 22 with resistance varying over temperature that generates indications of temperature of the electronic component 2, a temperature reader (comparing section) 12 coupled to the temperature sensor 11 to receive the indications of temperature from the temperature sensor 11, the temperature reader 12 being capable of interpreting the indications of temperature and generating temperature signals from the temperature indications, a feedback control circuit coupled to the temperature reader 12 to receive the temperature signals from the temperature reader, the feedback control circuit comprising a control

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output coupled to the control input of the Peltier driver 13 to provide control signals regulating the current to the Peltier module 1. It is further understood that the feed back control circuit provides a first control signal regulating the current to the Peltier module 1 in response to receiving a first temperature signal, the first temperature signal signifying a temperature above a preset high temperature limit, and the first control signal directing the Peltier driver 13 to provide a first current to the Peltier module 1, the first current flowing in the first direction to cause the cooling side 5 to absorb heat from the electronic component 2. Likewise, the cooling side 5 of the Peltier module 1 releases heat when the current flows through the Peltier module 1 in a second direction, the feed back control circuit providing a second control signal regulating the current to the Peltier module in response to receiving a second temperature signal signifying a temperature below a preset low temperature limit, the second control signal directing the Peltier driver 13 to provide a second current to the Peltier module, the second current flowing in the second direction and causing the cooling side 5 to release heat. See particularly Fig. 4 and column 6, lines 7-44.

Regarding claim 54, Nagakubo et al. disclose a cooling system for an electronic component comprising a Peltier module 1 comprising a cooling side 5 that absorbs heat when electric current flows through the Peltier module 1 in a first direction, a Peltier driver 13 comprising a control input capable of receiving a control signal, the Peltier driver 13 being coupled to the Peltier module 1 to provide to the Peltier module 1 a current regulated by the control signal, a temperature sensor 11 that generates indications of temperature of the component, and a feedback mechanism that receives

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the temperature indications from the temperature sensor 11 and adjusts the control signal to vary the current to the Peltier module 1 to prevent the temperature of the component from exceeding a predetermined parameter. See again Fig. 4 and column 6, lines 7-44. While Nagakubo et al. does not disclose that the cooling system is for an audio component of a vehicle as recited in the preamble of the claim, this is merely a statement of intended use for the invention and has no patentable significance. See MPEP § 2111.02.

Regarding claim 56, Nagakubo et al. disclose a cooling system for an electronic component comprising a Peltier module 1 comprising a cooling side 5 that absorbs heat when electric current flows through the Peltier module 1 in a first direction, a driver means 13 for providing to the Peltier module 1 a current regulated by a control signal, a temperature sensing means 11 for generating indications of temperature of the component, and a feedback means for varying the control signal in response to the indications of temperature to cause the driver means 13 to provide a temperature controlled current to the Peltier module 1 when the temperature of the component exceeds a predetermined parameter. See again Fig. 4 and column 6, lines 7-44. While Nagakubo et al. does not disclose that the cooling system is for an audio component as recited in the preamble of the claim, this is merely a statement of intended use for the invention and has no patentable significance. See MPEP § 2111.02.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 3, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5515682 (Nagakubo et al.) in view of US 6055814 (Song). As already discussed above, Nagakubo et al. disclose all the limitations of the claims except for a fan capable of blowing air to reduce temperature of the electronic component, wherein the fan is capable of blowing air at the electronic component. Song teaches a temperature control system for electronic components 20-50 comprising a Peltier module 80 and a fan 90 capable of blowing air to reduce temperature of the electronic components 20-50 wherein the fan 90 is capable of blowing air at the electronic components 20-50. See particularly Fig. 3 and column 3, lines 20-31. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included in the system of Nagakubo et al. a fan capable of blowing air at the electronic component because Song teaches that such a fan allows for more efficient and even cooling, and furthermore the use of fans to cool electronic devices is notoriously well known in the art.

5. Claims 2, 4, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5515682 (Nagakubo et al.) in view of US 5946188 (Rochel et al.). As already discussed above, Nagakubo et al. disclose all the limitations of the claims except for a fan capable of blowing air to reduce temperature of the electronic component, wherein the fan is capable of blowing air at a heat sink attached to the electronic component and attached to the cooling side of the Peltier module. Rochel et al. demonstrate that such

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an arrangement is already known in the art. Rochel et al. teach a temperature control system for an electronic component (transistors) 28 comprising a heat sink (tunnel) 40 and a fan 32 capable of blowing air at the heat sink 40 to reduce the temperature of the electronic component 28, wherein the cooling side of a Peltier module 90 is attached to the heat sink 40. In this arrangement, heat from the electronic component 28 is absorbed and conducted to the heat sink 40, which in turn is cooled by the cooling side of the Peltier module 90 and the air being blown by the fan 32. Refer particularly to column 3, line 32 to column 4, line 20. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included in the system disclosed by Nagakubo et al. the fan and heat sink arrangement taught by Rochel et al. because the arrangement would allow more heat to be drawn away from the electronic component and therefore provide greater cooling power.

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 5515682 (Nagakubo et al.) in view of US 5457342 (Herbst, II). As already discussed above, Nagakubo et al. disclose all the limitations of the claims except for a fan capable of blowing air, wherein the fan blows the air at the warming side of the Peltier module to remove heat from the warming side. Herbst, II teaches a temperature control system comprising a Peltier module 18 having a cold side 20 and a warm side 22/24 and a fan 30 capable of blowing air towards the warm side 22/24 of the Peltier module 18 to remove heat from the warm side 22/24. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a fan in the system disclosed by Nagakubo et al. to blow air to remove heat from the warm side of the

Peltier module as taught by Herbst, II, because this would facilitate cooling of the electronic component to be cooled.

7. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5515682 (Nagakubo et al.) in view of US 5385022 (Kornblit). As already discussed above, Nagakubo et al. disclose all the limitations of the claims except for expressly indicating that the Peltier module comprises antimony-bismuth thermocouples or bismuth telluride doped with selenium and antimony. Such Peltier modules, however, are already known. Kornblit teaches a Peltier cooling device and describes that use of antimony-bismuth (BiSb) thermocouples and bismuth telluride alloys doped with antimony and selenium (BiSbTeSe) are already conventional materials used in the art. See column 12, lines 1-12. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the recited materials in the Peltier module in the system of Nagakubo et al. because Kornblit teaches that these are already conventional and are capable of achieving very cold temperatures.

8. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 5515682 (Nagakubo et al.) in view of US 6196003 B1 (Macias et al.). As already discussed above, Nagakubo et al. disclose all the limitations of the claims except for expressly having the temperature sensor in direct contact with the electronic component. Macias et al. teach a temperature control system for an electronic component (CPU) 25 comprising Peltier modules 33 which are controlled by a controller unit 7, the controller unit 7 receiving input signals from a temperature sensor 69 that is in direct contact with the electronic component 25. Refer to column 6, lines 55-64 and

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Fig. 8C. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have contacted the temperature sensor in the system disclosed by Nagakubo et al. directly with the electronic component, as is demonstrated by Macias et al., because this would provide the temperature sensor with the most accurate temperature reading of the electronic component.

9. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5515682 (Nagakubo et al.) in view of US 6196003 B1 (Macias et al.) as applied to claim 14 above, and further in view of US 6234240 B1 (Cheon). The combination of Nagakubo et al. and Macias et al. demonstrate all the limitations of the claim except for wherein the Peltier module is in direct contact with the electronic component or wherein the electronic component comprises an upper portion, and the Peltier module is in direct contact with the upper portion. Referring to Fig. 3, Cheon teaches a cooling system for an electronic component (chip) 10, wherein the electronic component has an upper portion, and a Peltier module 14 is in direct contact with the upper portion of the electronic component 10. See also column 3, lines 28-33. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have situated the Peltier module in the combination of Nagakubo et al. and Macias et al. in direct contact with the upper portion of the electronic component, as is demonstrated by Cheon, because the direct contact would allow greater transfer of heat from the component to the Peltier module. Furthermore such a modification would merely involve a rearrangement of parts, which would be well within the knowledge of one of ordinary skill in the art.

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10. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 5515682 (Nagakubo et al.) in view of US 6196003 B1 (Macias et al.) as applied to claim 14 above, and further in view of US 5946188 (Rochel et al.). The combination of Nagakubo et al. and Macias et al. demonstrate all the limitations of the claim except for a heat sink attached to the electronic component wherein the Peltier module is in direct contact with the heat sink. Rochel et al. teach a temperature control system for an electronic component (transistors) 28 comprising a heat sink (tunnel) 40 that is attached to the electronic component 28 and a Peltier module 90 in direct contact with the heat sink 40. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included in the combination of Nagakubo et al. and Macias et al. the heat sink arrangement taught by Rochel et al. because the arrangement would allow more heat to be drawn away from the electronic component and therefore provide greater cooling power.

Allowable Subject Matter

11. Claims 27-53, 58-66 are allowed.
12. Claims 5, 6, 12, 13, 19-26, 55 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 6173576 B1 (Ishida et al.): discloses a cooling system comprising a Peltier device, fan, and control means.

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US 6581388 B2 (Novotny et al.): discloses a cooling system comprising a Peltier device and fluid circulation means.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard L. Leung whose telephone number is 571-272-4811. The examiner can normally be reached on Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl J. Tyler can be reached on 571-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Richard L. Leung
Examiner
Art Unit 3744


CHERYL TYLER
SUPERVISORY PATENT EXAMINER

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